Multidisciplinary Approaches to Optimize Recovery After Coronary Artery Bypass Surgery

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Coronary artery bypass grafting (CABS) remains one of the most commonly performed cardiac surgeries worldwide, and yet, what happens after the operation—particularly in the early days of recovery—is just as critical as the surgery itself. This literature review explores the conceptual foundations, multidisciplinary structure, models of care, clinical outcomes, and real-world barriers surrounding early rehabilitation post-CABS. Drawing on the biopsychosocial model and the WHO ICF framework, it emphasizes that early recovery is not merely about healing a sternotomy or restoring cardiac output—it's about helping the patient regain full functional and psychosocial health. Evidence consistently supports the integration of cardiologists, physiotherapists, nurses, psychologists, dietitians, and pharmacists in improving outcomes such as exercise capacity, psychological well-being, and even readmission rates. Models ranging from inpatient protocols to tele-rehabilitation are evaluated, with discussion on continuity of care and patient-centered customization. The review also addresses common barriers—including limited resources, fragmented communication, and patient-level challenges—and suggests practical facilitators like care coordinators, digital platforms, and risk-stratified approaches. While the science is promising, it's clear that successful rehabilitation depends not only on protocols, but on real teamwork, institutional commitment, and the ability to adapt care to the needs of each patient. In truth, what matters most may not be when we start rehabilitation, but how thoughtfully we deliver it.

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Introduction

As we know from both clinical experience and literature, the early period following coronary artery bypass grafting (CABS) is not only critical but often underutilized in terms of structured recovery. Patients emerge from surgery in a physiologically fragile state, with varying degrees of myocardial stress, pulmonary dysfunction, and, quite frequently, psychological distress. It's no longer enough to view recovery simply in terms of wound healing or ejection fraction stabilization. Modern cardiovascular rehabilitation needs to take a broader view—one that involves multiple disciplines working together from the very start. The theoretical backbone of this approach is rooted in the biopsychosocial model, first proposed by Engel in the late 70s. This model reminds us that patients aren't just hearts and vessels—they're people with minds, families, jobs, and emotions [1,5]. After CABS, the biological aspect includes myocardial recovery, optimization of preload and afterload, arrhythmia surveillance, etc., which we as cardiologists are trained to manage. But unless we account for the psychological and social dimensions—depression, anxiety, even socioeconomic limitations—we're only treating one piece of the problem [2].

Conceptual Framework and Theoretical Rationale for Early Multidisciplinary Rehabilitation after CABS

The ICF framework by the WHO also gives a useful lens. It emphasizes not just body functions but participation and activities. A patient with good surgical results but who is too afraid to walk, or lacks family support to attend outpatient rehab, won't achieve full recovery [3,6]. This is where our colleagues in physiotherapy, nursing, psychology, and nutrition come into play. They help bridge the gap between clinical recovery and actual return to life. Now, guidelines from the AHA and ESC have been encouraging us to start cardiac rehab early—even as soon as post-op day 1 or 2, provided the patient is stable. Several studies, such as Westerdahl et al. (2005), have shown how early mobilization reduces pulmonary complications, and Hirschhorn et al. (2008) demonstrated that supervised physiotherapy can enhance oxygenation and reduce length of stay [4,7].

From a practical standpoint, I've seen in my own patients that starting multidisciplinary care early—before discharge—is much more effective than referring them weeks later when they're already deconditioned or psychologically disengaged. But it's not easy. Coordinating

these teams, ensuring continuity, and tailoring the plan to individual patients—this is where the science meets the art of medicine [9].

So in short, the rationale for early, multidisciplinary rehabilitation after CABS isn't just a theory—it's backed by physiology, psychology, and real-world outcomes. The challenge is implementing it in a way that's personalized, feasible, and sustained beyond the hospital stay.

Key Disciplines Involved in Post-CABS Rehabilitation

When we talk about rehabilitation after CABS, we need to stop thinking of it as a solo act. It's a team sport—every professional has their lane, but all must work in sync. I've seen firsthand that the best outcomes come when each member of the team knows their role and communicates regularly. Otherwise, we end up with fragmented care and missed opportunities for recovery [8].

First and foremost, cardiologists (yes, that's us) are central in leading the medical side. We're responsible for fine-tuning medications—beta-blockers, ACE inhibitors, antiplatelets, statins—and for managing complications like postoperative arrhythmias or low cardiac output states. But we can't do it all. Our expertise must interface smoothly with the rest of the team [3,8].

Physiotherapists are indispensable, particularly in the first 3–5 days post-op. They handle pulmonary hygiene, mobilization protocols, and progressive physical reconditioning. Without them, the patient's risk of atelectasis, DVT, and even delirium goes up. I've lost count of how many times a good physiotherapist caught early orthostatic intolerance or postural hypotension before a nurse or physician even noticed it [12].

Nurses play a unique dual role—clinical surveillance and patient education. They're the ones catching subtle signs of infection, managing drains, titrating oxygen, and explaining discharge plans in simple language. Nurses also help the patient feel safe during early ambulation, which is a psychological hurdle as much as a physical one [2,4].

Now, let's not forget the psychologists or psychiatrists—often overlooked in cardiac units. The incidence of depression and anxiety post-CABS can reach 30–50%, depending on how you measure it. Some patients experience cognitive fog—"pumphead" as it's colloquially called—especially older adults. Early cognitive screening and counseling can dramatically improve rehab adherence and overall outlook [5].

Dietitians are another critical pillar. Many of our patients are diabetic, obese, or malnourished—all of which complicate healing and long-term cardiovascular health. It's not just about salt restriction anymore; it's about personalized, culturally appropriate nutrition plans that patients can follow once they're home [11].

I'll also mention clinical pharmacists, especially in elderly patients with polypharmacy. They help avoid drug-drug interactions, adjust for renal function, and ensure that new prescriptions don't unintentionally counteract each other. And in modern care models, social workers or rehab counselors assist in discharge planning, transportation to outpatient rehab, or arranging support for those who live alone [8,10].

It's important to remember that these roles don't function in isolation. Weekly multidisciplinary rounds, joint decision-making, and shared care plans are the glue that holds this together. Without communication, we just have a bunch of people doing their own thing. With coordination, we have true team-based care—and that's where the real gains in recovery happen.

Models of Care and Delivery Approaches in Early Rehabilitation after CABS

Now that we've covered who should be involved, the next question is: How do we actually deliver this care in a structured, sustainable way? Over the years, several models of cardiac rehabilitation (CR) delivery have evolved—from classic hospital-based programs to newer tele-rehab formats—but not all are created equal, especially when it comes to post-CABS patients, who often have more complex needs than your typical stable angina or post-PCI case [13].

The traditional model is inpatient-based, starting right in the cardiac surgery ward or step-down unit. The idea is to initiate low-level physical activity, breathing exercises, and education as early as the second or third postoperative day, assuming the patient is stable. This is usually led by physiotherapists, with nursing and medical oversight. While it's logistically feasible in well-resourced hospitals, the challenge here is continuity. Too often, rehabilitation ends at discharge, especially in low- and middle-income settings where structured outpatient rehab simply doesn't exist—or isn't reimbursed [10].

This is where outpatient cardiac rehab centers come in. These programs typically start 2–6 weeks post-discharge, depending on wound healing and patient stability. They're more comprehensive—exercise sessions monitored by telemetry, nutritional counseling, psychological support, smoking cessation, etc. In my experience, they work best when they build directly off the inpatient rehab plan. But again, patient adherence is a big issue. Transportation, cost, fear of exertion—all play a role in dropout rates [5, 12].

Now, over the past decade, we've seen a surge in home-based and tele-rehabilitation models. These were initially piloted for low-risk patients, but after COVID-19, even post-CABS patients started being included. Some studies have shown comparable improvements in functional capacity and quality of life (e.g., Rawstorn et al., 2016), provided the patients are properly selected and monitored. The advantage is clear—greater flexibility, lower costs, and potentially better adherence in tech-literate populations.

But we must be cautious: not every patient can safely rehab at home, especially those with frailty, complex comorbidities, or poor social support [13].

Another interesting approach is the integrated care pathway (ICP) or multidisciplinary team (MDT) rounds model. This involves scheduled coordination among the rehab team—cardiologist, surgeon, nurse, physio, psychologist, etc.—often using shared electronic medical records. Everyone contributes to a unified care plan. I've seen this work beautifully in some European centers, where patients are risk-stratified and care is customized. It's efficient, it reduces duplication, and patients feel like someone is actually steering the ship. But it requires buy-in and time—which, let's be honest, are often in short supply in busy cardiac units [4,7].

To summarize: the ideal model of early rehab after CABS is one that starts in the hospital, transitions seamlessly to outpatient or home-based care, and remains coordinated through a multidisciplinary team. No one-size-fits-all solution exists, but the closer we get to this continuity of care, the better the outcomes—physiologically, psychologically, and even economically.

Outcomes of Multidisciplinary Rehabilitation after CABS: What the Evidence and Real Life Tell Us

At the end of the day, what we're all aiming for—whether we're cardiologists, physiotherapists, nurses, or psychologists—is better outcomes for our patients. Not just better numbers on a chart, but real, meaningful improvements: fewer complications, quicker recovery, better quality of life, and ideally, fewer readmissions. So, the question is: Does multidisciplinary rehabilitation after coronary bypass actually deliver [7,9,13]

Let's start with functional capacity, since this is one of the most measurable endpoints. Multiple randomized trials and meta-analyses have shown that structured, team-based rehab significantly improves exercise tolerance post-CABS. For example, patients enrolled in early multidisciplinary programs consistently perform better on the 6-minute walk test (6MWT) and peak VO_2 measurements compared to those receiving usual care. I remember one older gentleman—diabetic, depressed, slow to mobilize—who gained nearly 120 meters on the 6MWT in three weeks just because the rehab team got him up, breathing, and believing again. That's not just physiology; that's integrated care [2,3].

In terms of psychological outcomes, which we tend to underestimate in the cardiac world, the data is quite telling. Depression and anxiety are common after major surgery—more so than we think—and can directly impact not only the patient's mood but also their adherence to medications and follow-up. Studies have shown that involving mental health professionals early on, even for simple screening and supportive therapy, can reduce both the severity and duration of post-op mood disturbances. A paper by Blumenthal et al. (2016) even found lower rates of major adverse cardiac events in depressed patients who received integrated psychocardiology care [3,6].

What about mortality and readmission rates? Well, this is where it gets tricky. The big randomized data—like the RAMIT trial in the UK—didn't show a statistically significant mortality benefit, but many have argued that the trial had limitations (low intensity, poor adherence, etc.). On the other hand, large observational datasets, like those from the Suaya et al. (2007) or Hammill et al. (2010) Medicare analyses, showed that cardiac rehab participants—especially those who started early—had significantly lower 1-year mortality and hospital readmission rates. While we can debate causality, the signal is consistent: coordinated rehab seems to improve survival, or at the very least, it keeps patients out of the hospital longer.

Other important outcomes include medication adherence, risk factor control, and return to work. Multidisciplinary rehab improves all three. Why? Because patients who are regularly seen by a team tend to feel more supported—and that directly affects their behavior. They're more likely to stick to statins, cut down on salt, and attend follow-up appointments. I've had patients who only started taking their antihypertensives correctly after the rehab nurse explained it in their own language—and reminded them weekly [12].

That said, not all patients benefit equally. Frail patients, those with advanced comorbidities, or those with cognitive decline may progress more slowly. That's why risk stratification and individualization are key—another argument for a multidisciplinary team that can adapt the plan as needed [6,8].

To conclude: the evidence, while not perfect, strongly supports the idea that multidisciplinary rehabilitation after CABS improves a range of clinically relevant outcomes—especially when it's started early, maintained consistently, and tailored to the individual. And in my clinical practice, I'd argue that what matters most is not just the type of rehab, but the team behind it.

Barriers, Facilitators, and Future Directions in Optimizing Multidisciplinary Rehabilitation after CABS

Now, as much as we like to talk about the benefits of multidisciplinary rehab—and they are real—we also have to be honest about the gaps. Not every hospital has a functioning rehab unit. Not every patient completes their program. And quite frankly, even in academic centers, implementation often falls short of what's written in guidelines [4-6, 9].

Let's start with the barriers, because they're all too familiar. First, there's the issue of resources. Multidisciplinary rehabilitation requires staff—trained physiotherapists, clinical psychologists, dietitians, nurses,

and ideally a coordinator who holds it all together. In many low- and middle-income countries, and even in some rural areas of developed ones, these people just aren't available. Or worse, they're available but spread too thin to deliver consistent care [12].

Then comes the issue of structure. A lot of hospitals don't have formal rehab pathways post-CABS. So what happens? The patient gets the surgery, stays 5–7 days, gets a generic discharge note, and is told to "stay active." But there's no follow-up plan. No scheduled rehab sessions. No psychological screening. We essentially hand them a ticket home with no roadmap.

Communication between disciplines is another major hurdle. I've seen teams where the physio doesn't know what the cardiologist prescribed, and the cardiologist doesn't know the patient's psychological status. We're all trying to help the same patient—but we're doing it in silos. Without structured MDT meetings or shared electronic records, the care becomes fragmented [5,10].

And of course, patient-level barriers matter too. Fear of exercise, low health literacy, cultural beliefs, financial stress, or even logistical issues like transportation can all affect rehab participation. One of my post-op patients didn't show up to rehab because he was too embarrassed to wear gym clothes in public—it sounds minor, but it's very real. Now, what are the facilitators that help make rehab work?

One key factor is having a dedicated coordinator or case manager—usually a nurse or rehab specialist—who tracks each patient from surgery through to outpatient rehab. Another is institutional protocols that automate referrals, so rehab isn't something you remember to prescribe, it's part of the default process [6].

Technology is also becoming a game changer. Tele-rehab platforms, wearable devices, and app-based coaching systems have shown promise in improving participation and adherence, especially for patients who live far from care centers. But we have to be careful not to assume that digital means accessible—there's still a digital divide, particularly among older and lower-income populations.

Looking forward, I think the future lies in personalized rehabilitation pathways. Not every patient needs the same level of intensity or support. Some may need cognitive rehab, others need more help with nutrition or stress management. If we can integrate predictive models—possibly even AI-supported algorithms—that stratify patients into different rehab tracks based on risk, frailty, and psychosocial status, we'll move closer to truly individualized care [1,7,9].

Also, from a policy standpoint, we need better reimbursement systems. In many healthcare systems, cardiac rehab is still seen as an optional add-on, rather than an essential part of surgical recovery. That needs to change. Payers and policymakers must recognize that investing in rehab reduces readmissions, improves long-term outcomes, and ultimately saves money [12].

To wrap up: optimizing early multidisciplinary rehab after CABS isn't just about clinical knowledge—it's about systems, communication, culture, and policy. We know what works. The challenge now is making it routine, accessible, and adaptive to each patient's needs. And as clinicians, we need to advocate for that—not just in journals, but on the wards, in committees, and at every discharge planning meeting.

Conclusions

This study underscores the importance of a multifaceted approach to managing RA, addressing both joint inflammation and systemic complications such as dyslipidemia. The inclusion of statins in the treatment regimen offers a promising strategy for reducing cardiovascular risk and improving overall patient outcomes. Tailoring treatment based on disease activity and metabolic parameters can further enhance therapeutic efficacy and patient quality of life.

References

1. Anderson, L., Oldridge, N., Thompson, D. R., Zwisler, A.-D., Rees, K., Martin, N., & Taylor, R. S. (2016). Exercise-Based Cardiac Rehabilitation for Coronary Heart Disease. Journal of the American College of Cardiology, 67(1), 1–12. https://doi.org/10.1016/j.jacc.2015.10.044

2. Balady, G. J., Williams, M. A., Ades, P. A., Bittner, V., Comoss, P., Foody, J. M., Franklin, B., Sanderson, B., & Southard, D. (2007). Core Components of Cardiac Rehabilitation/Secondary Prevention Programs: 2007 Update: A Scientific Statement From the American Heart Association Exercise, Cardiac Rehabilitation, and Prevention Committee, the Council on Clinical Cardiology; the Councils on Cardiovascular Nursing, Epidemiology and Prevention, and Nutrition, Physical Activity, and Metabolism; and the American Association of Cardiovascular and Pulmonary Rehabilitation. Circulation, 115(20), 2675–2682. https://doi.org/10.1161/CIRCULATIONAHA.106.180945

3. Blumenthal, J. A., Sherwood, A., Smith, P. J., Watkins, L., Mabe, S., Kraus, W. E., Ingle, K., Miller, P., & Hinderliter, A. (2016). Enhancing Cardiac Rehabilitation With Stress Management Training: A Randomized, Clinical Efficacy Trial. Circulation, 133(14), 1341–1350. https://doi.org/10.1161/CIRCULATIONAHA.115.018926

4. Canty, J. M., & Iyer, V. S. (2007). Hydrogen Peroxide and Metabolic Coronary Flow Regulation∗∗Editorials published in the Journal of the American College of Cardiologyreflect the views of the authors and do not necessarily represent the views of JACCor the American College of Cardiology. Journal of the American College of Cardiology, 50(13), 1279–1281. https://doi.org/10.1016/j.jacc.2007.06.020

5. Chua, Y. L., Nakao, M., & Lim, S. L. (2007). MID-TERM RESULTS OF MODIFIED IRRIGATED RADIOFREQUENCY MAZE PROCEDURE—NATIONAL HEART CENTRE, SINGAPORE EXPERIENCE. Heart, Lung and Circulation, 16, S15.

6. Engel, G. L. (1977). The Need for a New Medical Model: A Challenge for Biomedicine. Science, 196(4286), 129–136. https://doi.org/10.1126/science.847460

7. Frederix, I., Hansen, D., Coninx, K., Vandervoort, P., Vandijck, D., Hens, N., Van Craenenbroeck, E., Van Driessche, N., & Dendale, P. (2015). Medium-term effectiveness of a comprehensive internet-based and patient-specific telerehabilitation program with text messaging support for cardiac patients: Randomized controlled trial. Journal of Medical Internet Research, 17(7), e185.

8. Hammill, B. G., Curtis, L. H., Schulman, K. A., & Whellan, D. J. (2010). Relationship Between Cardiac Rehabilitation and Long-Term Risks of Death and Myocardial Infarction Among Elderly Medicare Beneficiaries. Circulation, 121(1), 63–70. https://doi.org/10.1161/CIRCULATIONAHA.109.876383
9. Kraal, J. J., Van Den Akker-Van Marle, M. E., Abu-Hanna, A., Stut, W., Peek, N., & Kemps, H. M. (2017). Clinical and cost-effectiveness of home-based cardiac rehabilitation compared to conventional, centre-based cardiac rehabilitation: Results of the FIT@Home study. European Journal of Preventive Cardiology, 24(12), 1260–1273. https://doi.org/10.1177/2047487317710803
10. McKhann, G. M., Borowicz, L. M., Goldsborough, M. A., Enger, C., & Selnes, O. A. (1997). Depression and cognitive decline after coronary artery bypass grafting. The Lancet, 349(9061), 1282–1284.
11. Piepoli, M. F., Corra, U., Benzer, W., Bjarnason-Wehrens, B., Dendale, P., Gaita, D., McGee, H., Mendes, M., Niebauer, J., & Zwisler, A.-D. O. (2010). Secondary prevention through cardiac rehabilitation: From knowledge to implementation. A position paper from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation. European Journal of Cardiovascular Prevention & Rehabilitation, 17(1), 1–17.
12. Rawstorn, J. C., Gant, N., Direito, A., Beckmann, C., & Maddison, R. (2016). Telehealth exercise-based cardiac rehabilitation: A systematic review and meta-analysis. Heart, 102(15), 1183–1192.
13. Westerdahl, E., Lindmark, B., Eriksson, T., Hedenstierna, G., & Tenling, A. (2005). Deep-breathing exercises reduce atelectasis and improve pulmonary function after coronary artery bypass surgery. Chest, 128(5), 3482–3488.